

§ 179.100-6

heater element may be reduced to one-half that required for the shell.

[29 FR 18995, Dec. 29, 1964. Redesignated at 32 FR 5606, Apr. 5, 1967, and amended by Amdt. 179-10, 36 FR 21344, Nov. 6, 1971; Amdt. 179-50, 60 FR 49077, Sept. 21, 1995]

§ 179.100-6 Thickness of plates.

(a) The wall thickness after forming of the tank shell and heads must not be less than that specified in § 179.101, nor that calculated by the following formula:

$$t = Pd / 2SE$$

Where:

d = Inside diameter in inches;

E = 1.0 welded joint efficiency; except for heads with seams=0.9;

P = Minimum required bursting pressure in p.s.i.;

S = Minimum tensile strength of plate material in p.s.i., as prescribed in § 179.100-7;

t = Minimum thickness of plate in inches after forming.

(b) If plates are clad with material having tensile strength properties at least equal to the base plate, the cladding may be considered a part of the base plate when determining thickness. If cladding material does not have tensile strength at least equal to the base plate, the base plate alone shall meet the thickness requirement.

(c) When aluminum plate is used, the minimum width of bottom sheet of tank shall be 60 inches, measured on the arc, but in all cases the width shall be sufficient to bring the entire width of the longitudinal welded joint, including welds, above the bolster.

[29 FR 18995, Dec. 29, 1964. Redesignated at 32 FR 5606, Apr. 5, 1967, and amended by Amdt. 179-10, 36 FR 21344, Nov. 6, 1971]

§ 179.100-7 Materials.

(a) *Steel plate*: Steel plate materials used to fabricate tank shell and manway nozzle must comply with one of the following specifications with the indicated minimum tensile strength and elongation in the welded condition. The maximum allowable carbon content must be 0.31 percent when the individual specification allows carbon greater than this amount. The plates may be clad with other approved materials.

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Specifications	Minimum tensile strength (p.s.i.) welded condition ¹	Minimum elongation in 2 inches (percent) welded condition (longitudinal)
AAR TC 128, Gr. B	81,000	19
ASTM A 302 ² , Gr. B	80,000	20
ASTM A 516 ²	70,000	20
ASTM A 537 ² , Class 1	70,000	23

¹ Maximum stresses to be used in calculations.

² These specifications are incorporated by reference (IBR, see § 171.7 of this subchapter).

(b) *Aluminum alloy plate*: Aluminum alloy plate material used to fabricate tank shell and manway nozzle must be suitable for fusion welding and must comply with one of the following specifications (IBR, see § 171.7 of this subchapter) with its indicated minimum tensile strength and elongation in the welded condition. * * *

Specifications	Minimum tensile strength (p.s.i.) 0 temper, welded condition ^{3,4}	Minimum elongation in 2 inches (percent) 0 temper, welded condition (longitudinal)
ASTM B 209, Alloy 5052 ¹	25,000	18
ASTM B 209, Alloy 5083 ²	38,000	16
ASTM B 209, Alloy 5086 ¹	35,000	14
ASTM B 209, Alloy 5154 ¹	30,000	18
ASTM B 209, Alloy 5254 ¹	30,000	18
ASTM B 209, Alloy 5454 ¹	31,000	18
ASTM B 209, Alloy 5652 ¹	25,000	18

¹ For fabrication, the parent plate material may be 0, H112, or H32 temper, but design calculations must be based on minimum tensile strength shown.

² 0 temper only.

³ Weld filler metal 5556 must not be used.

⁴ Maximum stress to be used in calculations.

(c) *High alloy steel plate*. (1) High alloy steel plate must conform to the following specifications:

Specifications	Minimum tensile strength (p.s.i.) welded condition ¹	Minimum elongation in 2 inches (percent) weld metal (longitudinal)
ASTM A 240/A 240M (incorporated by reference; see § 171.7 of this subchapter), Type 304L	70,000	30
ASTM A 240/A 240M (incorporated by reference; see § 171.7 of this subchapter), Type 316L	70,000	30

¹ Maximum stresses to be used in calculations.

(2)(i) High alloy steels used to fabricate tank must be tested in accordance with the following procedures in ASTM A 262, "Standard Practices for